

Chapter 3: Quick References

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Chapter 3: Quick References

Preventive Maintenance

There are many procedures that need to be followed or reviewed when performing Preventive Maintenance checks and replacements. Included are some general guidelines for cleaning areas of the instrument with a bleach solution, lubricating tips, and a reference list of PM procedures that are categorized by the instrument system.

Cleaning with a Bleach Solution

Follow the guidelines below to create the proper concentration of bleach solution for cleaning.

- Obtain a convenient quantity of bleach solution (available in one-gallon or about 3.3-liter volume).
- Note the concentration of the active ingredient, sodium hypochlorite (NaOCl) as provided on the label. Normally the concentration of commercially available bleach solution is 5.25%.
- Dilute the bleach solution to obtain a final active ingredient concentration of about 1.0%. To dilute the solution, make a five-fold dilution using 1.0 part original bleach solution and 4.0 parts distilled or deionized water.

Note: Sometimes the 1.0% has been referred to as 20%. This is based on the premise that the original bleach solution is 100% and a five-fold dilution of it results in a 20% concentration.

Lubricating Components

Note: Lubricate with Tufoil® Compu-Lube or equivalent unless otherwise specified in the PM Checklist.

PM Procedures Reference List

Cuvette Manufacturing (Formation) Area

Procedure Title	Location
• Adjusting the Cuvette Manufacturing Solenoids	XL Service, Chapter 5
• Aligning the Film Guides and Checking Tracking	XL Service, Chapter 5
• Adjusting the Cuvette Air Pressure Regulator	XL Service, Chapter 5

IMT Area

Procedure Title	Location
• Replacing TCO ₂ Probe O-Ring and Gasket	AR Reference, 6-1.1
• Replacing IMT Miscellaneous Tubing	XL Service, Chapter 6
• Aligning the IMT Probe	XL Service, Chapter 6
• Cleaning IMT Port	XL Service, Chapter 6

Pumps

Procedure Title	Location
• Replacing the Monopump Rotary Valve Seal	XL Operator's Guide Module 3
• Replacing Monopump Piston Lip Seal	XL Service, Chapter 6
• Adjusting Dual Pump Home Switch	AR Service 3-19
• Replacing Tubing (also see Water Tubing Diagram)	AR Routine Maintenance Guide Sections 3 and 4
• Replacing Syringe Tips	XL Operator's Guide Module 3

Reagent and Sample Areas

Procedure Title	Location
• Aligning Reagent Tray	XL Service, Chapter 9
• Aligning the Sample Probe	XL Service, Chapter 10
• Cleaning the Sample Drain	XL Service, Chapter 10
• Replacing the Sample Tubing	XL Operator's Guide Module 3

Power and Control System Areas

Procedure Title	Location
• Checking the UPS Functionality	XL Service, Chapter 8
• Cleaning the Thermal Print Head and Platen	XL Service, Chapter 4
• Performing Printer Diagnostics	XL Service, Chapter 4
• Performing Photometer Calibrations and Alignments	XL Service, Chapter 7
• Restoring Backup to Disk	XL Service, Chapter 4

Thermal Chamber Area

Procedure Title	Location
• Thermometer Calibration	XL Service, Chapter 11
• Calibrating Temperature Monitor Screen	XL Service, Chapter 11

Waste Area

Procedure Title	Location
• Schematic Diagram	XL Service, Chapter 14

Table 3-1. Sensors and Switches Used on the Dimension® XL

SPL Part Number	Part Description	Plug No.	Controlled By
729597.901	Aliquot Lid Closed Sensor	PJ31L	MCB 1
729597.901	IMT Sampler Vertical Home Sensor	PJ50E	MCB 3
729597.901	IMT Sampler Rotational Home Sensor	PJ50D	MCB 3
729597.901	Photometric Sampler Vertical Home Sensor	PJ50E	MCB 3
729597.901	Photometric Sampler Rotational Home Sensor	PJ50D	MCB 3
285001.003	Autoflex Loader Home Sensor	PJ22B	MCB 2
285001.003	IMT Probe Hidden Sensor	PJ58A	MCB 3
285001.003	Photometer Arm Home Sensor	PJ13D	Photometer Board
285001.003	Sample Carousel Home Sensor	PJ32C	MCB 1
285001.003	R2 Arm Vertical Home Sensor	PJ80B	MCB 2
285001.003	R2 Arm Radial Home Sensor	PJ80D	MCB 2
285001.003	R2 Arm Angular Home Sensor	PJ32D	MCB 2
285001.003	R1 Arm Vertical Home Sensor	PJ20D	MCB 2
285001.003	R1 Arm Radial Home Sensor	PJ20C	MCB 2
716761.902	R1 Pump Flush Syringe Home Switch	PJ16C	MCB 1
716761.902	R2 Pump Flush Syringe Home Switch	PJ16C	MCB 1
716761.902	R1 Pump Meter Syringe Home Switch	PJ16D	MCB 1
716761.902	R2 Pump Meter Syringe Home Switch	PJ16D	MCB 1
716761.902	Sample Pump Flush Syringe Home Switch	PJ15B	MCB 1
716761.902	Sample Pump Meter Syringe Home Switch	PJ15C	MCB 1
716486.503	U-Seal Position Switch	PJ13S	Cuvette Board
716736.903	Cuvette Pressure Switch	PJ30B	Cuvette Board
716737.503	Cuvette Ring Position Sensor	PJ32B	Cuvette Board

MCB = Motor Control Board

(continued)

Table 3-1. Sensors and Switches Used on the Dimension® XL (continued)

SPL Part Number	Part Description	Plug No.	Controlled By
716761.902	Dual Pump Switch	PJ15B, PJ15C PJ16B, PJ16D	MCB 1
716841.902	Filter Wheel Dual Sensor	PJ34B	Photometer Board
256254.001	Vacuum Switch	PJ30C	Auxiliary Board
734932.501	Flex Tray Sensor Assembly	PJ50H	MCB 2
734933.901	Reagent Lid Interlock Sensor (Not an SPL part)	PJ30D	Auxiliary Board
740049.901	Monopump Valve Position Sensor	PJ84	Printer Sequencer Bd
285001.004	Monopump Piston Home Sensor	PJ83	Printer Sequencer Bd
750164.501	Aliquot Wheel Home Sensor (Reflective)	PJ31F	MCB 1
750930.902	Flex Presence Sensor	PJ22C	Auxiliary Board
270779.001	Sample Lid Interlock Sensor (Not an SPL part)	PJ10	Fuse B Board

MCB = Motor Control Board

Table 3-1a. Sensors and Switches Used on the Dimension® RxL with HM

SPL Part Number	Part Description	Plug No.	Controlled By
285001.003	Wash Wheel Sensor	PJ42B	Motor Control PCB Slot 10
285001.003	Incubate Wheel Sensor	PJ41B	Motor Control PCB Slot 10
730145.901	Mix Position Sensor PCB	PJ44B	Cuvette PCB Slot 9
285001.003	Wash Probe Home Sensor	PJ45B	Motor Control PCB Slot 10
730515.901	Sample Drain Cleaner Bottle Sensor	PJ46G	Motor Control PCB Slot 10
730527.901	Probe Cleaner Bottle Sensor	PJ46E	Motor Control PCB Slot 10
730520.501	Wash Buffer Bottle Sensor	PJ46D	Motor Control PCB Slot 10
750930.902	Vessel Track Empty Sensor	J46C	Cuvette PCB Slot 9
716761.902	Wash Pump Home Switch	PJ83	Motor Control PCB Slot 10
285001.003	Vessel Shuttle Sensor	PJ48H, F, G	Motor Control PCB Slot 10
285001.003	Vessel Transfer Home Sensor	PJ48E	Motor Control PCB Slot 10
730572.901	Vessel Gate Switch	PJ48C	Motor Control PCB Slot 10
NA	Spare Sensor	PJ46A	Cuvette PCB Slot 9
730320.501	Wash Probe Vac. Sensor	1, 2 NC, 1, 2 Com	Cuvette PCB Slot 9

Table 3-2. Voltage Destinations for 5 and 15 Volts

Voltage	Pin No.	From	To
+5	B24	Auxiliary Board	AC Power Waste Pump Assy
+5	B5	Auxiliary Board	Sample Barcode Scanner (inside) 6P2
+5	B12	Auxiliary Board	Sample Barcode Scanner (outside) 6P2
+5	B17	Auxiliary Board	Autoflex Loader Flex Presence Sensor 6P2
+5	B8	Auxiliary Board	Flex Barcode Assy 6P1
LED +5	B28	Auxiliary Board	"OK" Add Flex Indicator 6P2
LED +5	A32	Auxiliary Board	Vacuum LED
LED +5	B8	Auxiliary Board	"OK" Add Sample Indicator 6P2
+5	A31	Auxiliary Board	AC Distribution Board
+5	B24	Auxiliary Board	Waste Pump
+5	B27	Cuvette Board	Pressure LED
+5	C11	Cuvette Board	Cuvette Ring Position Sensor
+5	B20	Cuvette Board	Cuvette Ring Position Sensor
+5	B5	Motor Control Board 1	R1 Pump Flush Syringe Home Sensor 3P2
+5	B12	Motor Control Board 1	R1 Pump Meter Syringe Home Sensor 3P2
+5	B20	Motor Control Board 1	R2 Pump Flush Syringe Home Sensor 3P1
+5	B27	Motor Control Board 1	R2 Pump Meter Syringe Home Sensor 3P1
+5	B8	Motor Control Board 1	Sample Pump Flush Syringe Home Sensor 3P1
+5	B15	Motor Control Board 1	Sample Pump Meter Syringe Home Sensor 3P1
+5	B17	Motor Control Board 1	Sample Carousel Home Sensor 3P2
+5	C28	Motor Control Board 1	Sample Carousel Encoder Assy 3P2
LED +5	A15	Motor Control Board 1	Aliquot Wheel
+5	B24	Motor Control Board 1	Aliquot Reflective Home Sensor
+5	C29	Motor Control Board 1	Aliquot Wheel Encoder Assy 3P2
+5	C27	Motor Control Board 1	Aliquot Lid Closed Sensor 3P2

(continued)

Table 3-2. Voltage Destinations for 5 and 15 Volts (continued)

Voltage	Pin No.	From	To
+5	B5	Motor Control Board 2	R2 Arm Vertical Home Sensor 4P2
+5	B12	Motor Control Board 2	R2 Arm Radial Home Sensor 4P2
+5	C28	Motor Control Board 2	R2 Arm Angular Encoder 4P2
+5	B17	Motor Control Board 2	R2 Arm Angular Home Sensor 4P2
+5	B27	Motor Control Board 2	R1 Arm Radial Home Sensor 4P1
+5	B20	Motor Control Board 2	R1 Arm Vertical Home Sensor 4P1
+5	B15	Motor Control Board 2	Autoflex Loader Home Sensor 4P1
+5	B8	Motor Control Board 2	Flex Tray Home Sensor 4P1
+5	C29	Motor Control Board 2	Flex Tray Encoder 4P2
+5	B8	Motor Control Board 3	Photometric Sample Handler Rotational Home Sensor 5P1
+5	B15	Motor Control Board 3	Photometric Sample Handler Vertical Home Sensor 5P1
+5	C28	Motor Control Board 3	Photometric Sample Handler Rotational Encoder Assy 5P2
+5	B5	Motor Control Board 3	IMT Rotational Home Sensor 5P2
+5	B12	Motor Control Board 3	IMT Penetration Home Sensor 5P2
+5	C29	Motor Control Board 3	IMT Rotational Encoder Assy 5P2
+5	C8	Motor Control Board 3	IMT Needle Hidden Sensor 5P2
LED +5	A9	Photometer Board	Filter Wheel Dual Sensor 1P1
LED +5	V10	Photometer Board	Filter Wheel Dual Sensor 1P1
+5	B11	Photometer Board	Filter Wheel Dual Sensor (Wht)
+5	B17	Photometer Board	Photometer Arm Motor Encoder 1P2
+5	B24	Photometer Board	Photometer Arm Home Sensor 1P2
+5	1	Power Supply	Backplane Board
+5	E4	Power Supply	Backplane Board
+5	E8	Power Supply	Backplane Board

(continued)

Table 3-2. Voltage Destinations for 5 and 15 Volts (continued)

Voltage	Pin No.	From	To
+5	1	Printer/Monopump Interface Board	System Printer Assy
+5	PJ54A 7	Printer/Monopump Interface Board	Monopump Home Sensor 5P2
+5	2	Motor Control Board 3	Monopump Valve Position and Home Sensor 5P2
+5	3	Motor Control Board 3	Monopump Valve Position and Home Sensor 5P2
+5	1	Motor Control Board 3	Monopump Valve Position and Home Sensor 5P2
+15	A1	Auxiliary Board	IMT Sensor Board
-15	A3	Auxiliary Board	IMT Sensor Board
+15	2	Fuse Board B	Sample Lid Switch Part 2
+15	3	Fuse Board B	Key Switch Part 2
+15	4	Fuse Board B	Key Switch Part 2
+15	C20	Photometer Board	Photodiode Assy 1P1
-15	C22	Photometer Board	Photodiode Assy 1P1
+15	E2	Power Supply	Backplane Board
+15	E5	Power Supply	Backplane Board
-15	E6	Power Supply	Backplane Board

Table 3-2a. Voltage Destinations for 5 and 15 Volts (RxL with HM)

Voltage	Pin No.	From	To
+5	C28	Motor Control PCB Slot 10	Incubate Wheel Encoder (10p2)
+5	C29	Motor Control PCB Slot 10	Wash Wheel Encoder (10p2)
+5	B5	Motor Control PCB Slot 10	Wash and Incubate Wheel Sensor (10p2)
+5	A31	Cuvette PCB Slot 9	Mixer Position Sensor PCB (9p1)
+5	C11	Motor Control PCB Slot 10	Spare Sensor (10p2)
+5	B12	Motor Control PCB Slot 10	Wash Probe Home Sensor (10p2)
+5	B20	Motor Control PCB Slot 10	Wash Pump Home Sensor (10p1)
+5	B20	Cuvette PCB Slot 9	Vessel Track Sensor (9p1)
+5	B27	Cuvette PCB Slot 9	Spare Sensor (9p1)
+5	A25	Cuvette PCB Slot 9	Spare Sensor (9p1)
+5	C15	Motor Control PCB Slot 10	Vessel Gate Switch (no connection) (10p2)
+5	C18	Motor Control PCB Slot 10	Vessel Shuttle PCB Assy—Vessel Shuttle Sensor (10p1)
+5	B15	Cuvette PCB Slot 9	Vessel Transfer Home Sensor (10p1)
+5	B8	Cuvette PCB Slot 9	Vessel Transfer Encoder (9p1)
+5	B15	Motor Control PCB Slot 10	Photometric Sample Handler V. Encoder (5p2)

Table 3-3. Voltage Destinations for 24 Volts

Voltage/Fuse	Pin No.	From	To
+24	2, 5, 8	Photometer Board	Printer Sequencer/Monopump Interface Board
+24 GND	3, 6, 9	Photometer Board	Printer Sequencer/Monopump Interface Board
+24 "6B"	A24	Auxiliary Board	Autoflex Loader Solenoid 6P1
+24	A12	Auxiliary Board	Sample Wash Valve 6P1
+24	B12	Auxiliary Board	Sample Pump Valve 6P1
+24	C12	Auxiliary Board	R2 Pump Valve 6P1
+24	C24	Auxiliary Board	R1 Pump Valve 6P1
+24	A16	Auxiliary Board	24V Power Module
+24	A26 (6P1)	Auxiliary Board	Instrument Alarm 6P1
+24	B24	Auxiliary Board	Water/Waste Overflow
+24	3, 4	Auxiliary Board	Water Bottle Switch Assy (non-plumbed)
+24	A7	Auxiliary Board	SSE Salt Solenoid
+24	B10	Auxiliary Board	SSM Salt Solenoid
+24	C8	Auxiliary Board	SSM Waste Solenoid
+24	A20	Auxiliary Board	TCO ₂ Release Solenoid
+24	C14	Auxiliary Board	Vacuum Solenoid
+24	C15	Auxiliary Board	Solenoid Pump
+24	A17	Auxiliary Board	Standard A Solenoid
+24	A11	Auxiliary Board	Standard B Solenoid
+24	A21	Auxiliary Board	Sample Pinch Solenoid
+24	C29	Auxiliary Board	Air Solenoid
+24	J9	Backplane Board	Photometer Source Lamp P72B
+24 "2C"	A4	Cuvette Board	Cuvette Heat Torch PCB
+24 "2C"	A5	Cuvette Board	Cuvette Heat Torch PCB
+24 "2B"	A6	Cuvette Board	Cuvette Formation Solenoid
+24 "2B"	A7	Cuvette Board	Cuvette Fan
+24 "2D"	A15	Cuvette Board	Cuvette Top Seal Heater
+24 "2D"	A16	Cuvette Board	Cuvette Top Seal Heater
+24 "2D"	A27	Cuvette Board	Cuvette Top Seal Solenoid

(continued)

Table 3-3. Voltage Destinations for 24 Volts (continued)

Voltage/Fuse	Pin No.	From	To
+24 "2D"	B15	Cuvette Board	Cuvette U-Seal Solenoid
+24 "2C"	B16	Cuvette Board	Cuvette Area Interlock Switch P13S
+24 "2C"	C16	Cuvette Board	Cuvette Area Interlock Switch P13S
+24 "2C"	C19	Cuvette Board	Cuvette Ring Index Motor (B Phase)
+24 "2C"	C26	Cuvette Board	Cuvette Ring Index Motor (A Phase)
+24 "2C"	A11	Cuvette Board	Thermal Chamber Heater
+24 "2C"	A12	Cuvette Board	Thermal Chamber Heater
+24 "2C"	A13	Cuvette Board	Thermal Chamber Heater
+24 "2D"	A23	Cuvette Board	Thermal Chamber Heater
+24 "2D"	A24	Cuvette Board	Thermal Chamber Heater
+24 "2D"	A25	Cuvette Board	Thermal Chamber Heater
+24 "3C"	A5	Motor Control Board 1	R1 Pump Flush Syringe Motor 3P2
+24 "3C"	A6	Motor Control Board 1	R1 Pump Flush Syringe Motor 3P2
+24 "3C"	A12	Motor Control Board 1	R1 Pump Meter Syringe Motor 3P2
+24 "3C"	A13	Motor Control Board 1	R1 Pump Meter Syringe Motor 3P2
+24 "3B"	A20	Motor Control Board 1	R2 Pump Flush Syringe Motor 3P1
+24 "3B"	A21	Motor Control Board 1	R2 Pump Flush Syringe Motor 3P1
+24 "3B"	A27	Motor Control Board 1	R2 Pump Meter Syringe Motor 3P1
+24 "3B"	A28	Motor Control Board 1	R2 Pump Meter Syringe Motor 3P1
+24 "3A"	A8	Motor Control Board 1	Sample Pump Flush Syringe Motor 3P1
+24 "3A"	A9	Motor Control Board 1	Sample Pump Flush Syringe Motor 3P1
+24 "3A"	A15	Motor Control Board 1	Sample Pump Meter Syringe Motor 3P1
+24 "3A"	A16	Motor Control Board 1	Sample Pump Meter Syringe Motor 3P1
+24 "3D"	A17	Motor Control Board 1	Sample Carousel Motor 3P2
+24 "3D"	A18	Motor Control Board 1	Sample Carousel Motor 3P2
+24 "3D"	A24	Motor Control Board 1	Aliquot Wheel Motor 3P2
+24 "3D"	A25	Motor Control Board 1	Aliquot Wheel Motor 3P2
+24 "4C"	A5	Motor Control Board 2	R2 Arm Vertical Motor 4P2
+24 "4C"	A6	Motor Control Board 2	R2 Arm Vertical Motor 4P2

(continued)

Table 3-3. Voltage Destinations for 24 Volts (continued)

Voltage/Fuse	Pin No.	From	To
+24 "4C"	A12	Motor Control Board 2	R2 Arm Radial Motor 4P2
+24 "4C"	A13	Motor Control Board 2	R2 Arm Radial Motor 4P2
+24 "4D"	A17	Motor Control Board 2	R2 Arm Angular Motor 4P2
+24 "4D"	A18	Motor Control Board 2	R2 Arm Angular Motor 4P2
+24 "4B"	A20	Motor Control Board 2	R1 Arm Vertical Motor 4P1
+24 "4B"	A21	Motor Control Board 2	R1 Arm Vertical Motor 4P1
+24 "4B"	A27	Motor Control Board 2	R1 Arm Radial Motor 4P1
+24 "4B"	A28	Motor Control Board 2	R1 Arm Radial Motor 4P1
+24 "4A"	A15	Motor Control Board 2	AutoFlex Loader Motor 4P1
+24 "4A"	A16	Motor Control Board 2	AutoFlex Loader Motor 4P1
+24 "4A"	A8	Motor Control Board 2	Flex Tray Wheel Motor 4P1
+24 "4A"	A9	Motor Control Board 2	Flex Tray Wheel Motor 4P1
+24 "5A"	A8	Motor Control Board 3	Photometric Sampler Rotational Motor
+24 "5A"	A9	Motor Control Board 3	Photometric Sampler Rotational Motor
+24 "5A"	A15	Motor Control Board 3	Photometric Sampler Vertical Motor 5P1
+24 "5A"	A16	Motor Control Board 3	Photometric Sampler Vertical Motor 5P1
+24 "5D"	A17	Motor Control Board 3	Monopump Valve Motor 5P2
+24 "5D"	A18	Motor Control Board 3	Monopump Valve Motor 5P2
+24 "5D"	A24	Motor Control Board 3	Monopump Piston Motor 5P2
+24 "5D"	A25	Motor Control Board 3	Monopump Piston Motor 5P2
+24 "5C"	A5	Motor Control Board 3	IMT Rotational Motor 5P2
+24 "5C"	A6	Motor Control Board 3	IMT Rotational Motor 5P2
+24 "5C"	A12	Motor Control Board 3	IMT Penetration Motor 5P2
+24 "5C"	A13	Motor Control Board 3	IMT Penetration Motor 5P2
+24 "5D"	A20	Motor Control Board 3	SSE 1 Peristaltic Pump Motor 5P1
+24 "5D"	A21	Motor Control Board 3	SSE 1 Peristaltic Pump Motor 5P1
+24 "1A"	A5	Photometer Board	Photometric Arm Motor 1P2
+24 "1A"	A6	Photometer Board	Photometric Arm Motor 1P2
+24	E3	Power Supply	Backplane Board
+24	E9	Power Supply	Backplane Board

Table 3-3a. Voltage Destinations for 24 Volts (RxL with HM)

Voltage/Fuse	Pin No.	From	To
24C	A6	Motor Control PCB Slot 10	Wash Wheel Motor (Phase B)
24C	A5	Motor Control PCB Slot 10	Wash Wheel Motor (Phase A)
24A	A8	Motor Control PCB Slot 10	Incubate Wheel Motor (Phase A)
24A	A9	Motor Control PCB Slot 10	Incubate Wheel Motor (Phase B)
24C	A11	Cuvette PCB Slot 9	Incubate Heater
24D	A25	Cuvette PCB Slot 9	Vessel Mix Motor 1
24D	A16	Cuvette PCB Slot 9	Vessel Mix Motor 2
24D	A21	Cuvette PCB Slot 9	Vessel Aspirate Pump 1 & 2
24C	A12	Motor Control PCB Slot 10	Wash Probe Motor (Phase A)
24C	A13	Motor Control PCB Slot 10	Wash Probe Motor (Phase B)
24B	A20	Motor Control PCB Slot 10	Wash Pump Motor (Phase A)
24B	A21	Motor Control PCB Slot 10	Wash Pump Motor (Phase B)
24D	A23	Cuvette PCB Slot 9	Wash Pump Valve 1
24D	A24	Cuvette PCB Slot 9	Wash Pump Valve 2
24D	C21	Cuvette PCB Slot 9	Probe Cleaner Pump
24D	B21	Cuvette PCB Slot 9	Sample Drain Cleaner Pump
24D	B15	Cuvette PCB Slot 9	Vessel Feed Motor
24B	C23	Cuvette PCB Slot 9	Spare Drive
24A	A15	Motor Control PCB Slot 10	Vessel Transfer Motor (Phase B)
24A	A16	Motor Control PCB Slot 10	Vessel Transfer Motor (Phase A)
24D	A15	Cuvette PCB Slot 9	Vessel Shuttle Solenoid
24D	A27	Cuvette PCB Slot 9	Vessel Gate Solenoid
24B	A7	Cuvette PCB Slot 9	Vessel Friction Drive Motor

Table 3-4. Linear and Non-Linear Calibrations

Procedure	Perform these steps:
Preparation	<ol style="list-style-type: none"> 1. Perform system check within last 24 hours.
Choose Methods/Lots	<ol style="list-style-type: none"> 2. Choose methods and lot numbers to be calibrated. Calibrate methods together that use same calibrator: <ul style="list-style-type: none"> For Linear, CHEM 1 = BUN, CA, CREA, GLU, TP, URCA For Non-Linear, DRUG CALIBRATOR = DIG, PHNO, PTN, THEO
Prepare Calibrators	<ol style="list-style-type: none"> 3. Follow insert sheet instructions for calibrator preparation and use.
Set Up Calibration(s)	<ol style="list-style-type: none"> 4. Using the Calibration Set-Up screen, request calibration for those methods and lot numbers identified in Step 2 by specifying the calibrator to be used and filling in the bottle values.
Request QC	<ol style="list-style-type: none"> 5. Request QC to be run along with the calibrators by pressing the QC yes/no function key.
Assign Cups/Load Samples	<ol style="list-style-type: none"> 6. Press the function key to assign cup positions for the calibrator and QC. Press the LOAD/RUN function key and then load the calibrators and QC samples in the appropriate cup positions.
Process Calibrators/QC	<ol style="list-style-type: none"> 7. Press the PROCESS ALL key. When calibration is completed, the instrument will provide a printout with calibrator results, statistics, and QC results.
Evaluation	<ol style="list-style-type: none"> 8. Evaluate the precision and accuracy of the replicate values. Determine whether the slope and intercept are acceptable. <p>For Linear Calibration: Slope specification = 0.097–1.03 and intercept guideline = 0 or clinically insignificant. Determine if QC is within range.</p> <p>For Non-Linear Calibration: Slope specification = 0.95–1.05 and intercept guideline = 0 or clinically insignificant. Determine if QC is within range</p>
If slope/intercept/QC = OK	<ol style="list-style-type: none"> 9. Press the ACCEPT DATA function key.
If slope/intercept/QC = not OK	<ol style="list-style-type: none"> Press the CALCULATE function key; evaluate the new data and QC and, if OK, press the ACCEPT DATA function key.

Table 3-5. Verification Summary Sheet

Procedure	Perform these steps:
Preparation	1. Perform system check within last 24 hours.
Choose Methods/Lots	2. Choose methods and lot numbers to be calibrated. (verified??) Try to verify methods together that use the same verifier: for example, ENZYME VERIFIER = ALP,AMY,GGT,GOT,GPT,LDH
Prepare Verifiers	3. Follow insert sheet instructions for verifier preparation and use.
Set Up Verification(s)	4. Using the Calibration Set-Up screen, request verification for those methods and lot numbers identified in Step 2 by specifying the verifier to be used and filling in the bottle values.
Request QC	5. Request QC to be run along with the verifiers by pressing the QC yes/no function key.
Assign Cups/Load Samples	6. Press the function key to assign cup positions for the calibrator (verifier??) and QC. Press the LOAD/RUN function key and then load the calibrators and QC samples in the appropriate cup positions.
Process Verifiers/QC	7. Press the PROCESS ALL key. When verification is completed, the instrument will provide a printout with verifier results, statistics, and QC results.
Evaluation	8. Evaluate the precision and accuracy of the replicate values. Determine whether the slope and intercept are acceptable. Slope specification = 0.90–1.10 (lipase = 0.85–1.05) and intercept guideline = 0 or clinically insignificant. Determine if QC is within range.
If slope/intercept/QC = OK	9. Press the ACCEPT DATA function key.
If slope/intercept/QC = not OK	Perform normal chemistry troubleshooting (for example, check for clerical errors, proper preparation of verifiers and QC, etc.).
For Lipase and CK-MB Only: If Lipase slope /intercept/QC = not OK	Press the CALCULATE function key; evaluate the new data and QC and, if OK, press the ACCEPT DATA function key.
If CK-MB slope/intercept/QC = not OK	Press the CALCULATE function key IF the data at Level 1 verifier IS NOT between -3 to +3; evaluate the new data and QC, if it is now between -3 to +3, press the ACCEPT DATA function key.

Table 3-6. LEDs on Motor Control Boards

LED	Motor Control Board 1	Motor Control Board 2	Motor Control Board 3
CR2A	Sample Flush Pump Home	Flex Wheel Home	Sampler Angular Home
CR2B	N/C	N/C	N/C
CR2C	Sample Meter Pump Home	Flex Auto Load Home	Sampler Vertical Home
CR2D	N/C	N/C	N/C
CR3A	R2 Flush Pump Home	R1 Vertical Home	N/C
CR3B	N/C	N/C	N/C
CR3C	R2 Meter Pump Home	R1 Radial Home	IMT Valve Home
CR3D	N/C	N/C	IMT Valve Position
CR5A	R1 Flush Pump Home	R2 Vertical Home	IMT Angular Home
CR5B	N/C	N/C	IMT Needle Guard Home
CR5C	R1 Meter Pump Home	R2 Radial Home	IMT Vertical Home
CR5D	N/C	N/C	Level Sense
CR6A	Sample Wheel Home	R2 Angular Home	Monopump Piston Home
CR6B	N/C	N/C	N/C
CR6C	Aliquot Wheel Home	N/C	Monopump Valve Home
CR6D	Aliquot Lid Closed	N/C	Monopump Valve Position

Table 3-7. Printer DIP Switch Settings for International Characters

International Characters	DIP Switch Settings for SW1			
	4	3	2	1
U. S.	ON	ON	ON	ON
France	ON	ON	ON	OFF
Germany	ON	ON	OFF	ON
Spain 1	ON	OFF	OFF	OFF
Italy	ON	OFF	OFF	ON
Japan*	X	X	X	X

* X=Switch 1 (SW1) positions 1–4 can be ON or OFF.
Switch 2 (SW 2) position 6 **must** be OFF for Japan.

Note: Dip Switches are located on the top of the printer, underneath the top cover.

Table 3-8. Component Differences Between the XL and AR Instruments

System	Component
Control System	<ul style="list-style-type: none"> • Computer—off-the-shelf, OEM computer • Control Boards: <ul style="list-style-type: none"> – Backplane board – Fuse boards A and B distribute DC power to instrument – Photometer board – Cuvette/Thermal board – Motor Control boards (3) – Auxiliary board – Ultrasonics board • Printer/Monopump sequencer board • Cardcage fan/filter • Software • Keyboard—customized OEM keyboard with enhanced functionality • Monitor—off-the-shelf, OEM monitor • Printer—Seiko Model DPU 5000
Power System	<ul style="list-style-type: none"> • Uninterruptable Power Supply (UPS)—off-the-shelf, OEM part • AC Power Selection Board • Service Key Switch • AC Distribution Board • Circuit breaker • 24-volt power supply • Transformer
Cuvette Manufacturing System	<ul style="list-style-type: none"> • Cuvette Arm • Solenoid Formation Arm • U-Seal Solenoid bracket

(continued)

Table 3-8. Component Differences Between the XL and AR Instruments (continued)

System	Component
IMT System	<ul style="list-style-type: none"> • Monopump • SSE/SSM Board • Standard C • IMT Sample Handler • Solenoid Valves • IMT Drain • IMT Port • IMT Standard Bottle Lance • IMT Probe • IMT Tubing (Standard, Pump, Sample, and Miscellaneous) • Manifold Assembly • IMT Sample Handler Rotational Sensors
Measuring System	<ul style="list-style-type: none"> • Magnetic Separation System (DGNA) • Photodiode Assembly • Photometer • 340 Filter
Reagent System	<ul style="list-style-type: none"> • Bar Code Reader • R1 Arm • R2 Arm • R1 Tubing • Reagent Ultrasonics • Flex™ Automatic Loader System
Sample System	<ul style="list-style-type: none"> • Aliquot Wheel Assembly • Photometric Sample Handler • Segmented Sample Wheels • Sample Carousel • Bar Code Readers (Inner and Outer) • Sample Ultrasonics • Sample Lid Switch • Sample Handler Rotational Sensors • Sample Tubing
Thermal System	<ul style="list-style-type: none"> • Non-CFC Refrigeration System • Thermal Chamber • Thermal Chamber Heating Element • Thermal Chamber Monitoring Thermocouple • Cuvette Ring Thermistor
Accessory Kit	(See Accessory Kit List provided)

Table 3-9. Hot Keys (Keystroke Combinations)

Key Combination	Function
Alt/F	Displays an explanation and troubleshooting information for the error message that is on the screen.
Alt/I	Takes you directly to Review Reagent Cartridge inventory.
Alt/L	Displays Short Sample screen.
Alt/M	Displays explanations for active error messages.
Alt/N	Takes you directly to the System Needs screen.
Alt/O (not the number zero)	Advances the paper feed on the system printer.
Alt/P	Prints out the entire screen appearing on the display. This printout cannot be sent to an external printer. Note: You will not be able to move to any other screen when using Control/P to print; however, printing only takes about 30 seconds.
Alt/R	Whenever the reagent manager icon appears in the Operating Conditions Status area of the screen, press Alt/R to see the information on why this icon appeared.
Alt/S	Takes you directly to the Sample Status screen from which you can see the status of either the segment positions currently loaded on the instrument (On Board Segments view) or all segments (All Segments view).
Control/Stop	Stops all operations in progress in a manner that will not damage the instrument. All tests in progress will be aborted. However, all scheduled tests will be retained in instrument memory. To resume operations, press the Reset key.
Control/Help	Displays help information for each field and icons on the Main Operating Menu.
Shift/Exit	Returns you directly to the Operating menu.
Shift/Delete	Deletes all characters in a field.
Help	Gives you help on the current screen.

Note: **Alt/Help** will display a list of Hot Keys.

Table 3-10 lists modules that are purchased completely assembled and tested from original equipment manufacturers (OEMs). They are serviced only at the module level. Therefore, no supporting technical documentation is provided. These assemblies are replaced only in their entirety. The column headed "Service Spare P/N" is the Dade service spare part number. The "OEM" section of the table lists sources, models, and manufacturers' part numbers only if the module is available from them as a stocked item. If the module is custom built for the Dimension® XL, it is not available commercially and the OEM model or part number is not listed. These modules may be purchased only from Dade.

Table 3-10. Cross Reference for Service Spares and OEM Parts

Part Name	Service Spare P/N	Manufacturer	OEM Information	
			Model No.	P/N
Monitor	750312.502	Mitsubishi	Diamond Pro 14 Plus	SD4561CA
Printer	732538.501	Seiko	LTP 5442-832	DPU-5442-OHK
UPS	750909.502	Sola	056-303-02-1300VA	056-00303-0200-99
Computer	750080.502	Intel	Custom Model	486LP4S250
Keyboard	750525.503	*	—	—
Multioutput DC Power Supply	750907.501	Power One	SPF4A1C4D2	SPF4A1C4D2
Transformer	732660.901	**	—	—

* "Custom OEM" Keyboard; not commercially available

** "Custom OEM" package; not commercially available

Indirect IMT System Quick References

Table 3-11. Indirect IMT System Parameters

Throughput	70 samples or 280 tests per hour
Cycle Time	50.4 seconds per sample
Sample Size	45 mL for LYTES and Na/K tests (remains 45 mL when SSM available)
Fluids Run	Serum, Plasma, and Urine samples Aqueous Calibrators and Standards Serum-based QC products
Pumping Rate	64 to 77 μL /revolution
Air/Liquid	(Air value must be 2 times greater than liquid)
Air	>0.8
Liquid	<0.6

Table 3-12. Indirect IMT Ranges, References, and Coefficients

Acceptable IMT Slope Ranges	Na	K	Cl	TCO ₂
	53 to 62	53 to 62	-60 to -40	30 to 55

Reference Ranges	Na	K	Cl	TCO ₂	Urine
Reference Ranges for:					
Serum/Plasma	136–145	3.5–5.1	98–107	22–29	NA
Urine	40–220	25–125	110–250	NA	NA
Assay Ranges for:					
Serum/Plasma	50–200	1–10	50–200	5–45	NA
Urine	5–300	1–300	10–330	NA	NA

Coefficients	Na	K	Cl	TCO ₂	Urine Cl
C0	1.5	-0.2	-2.5	-6.0	-20
C1	1.01	1.05	1.06	1.15	1.06

Table 3-13. Indirect IMT System Standard Solutions

Consumable	Test Equivalents per Bottle or Cartridge
Standard A	1500
Standard B	650
Flush	1800
Salt Bridge	2500
TCO ₂ Release Agent	250
Diluent	700
QuikLYTE™ Multisensor Cartridge	1000
Sample	—

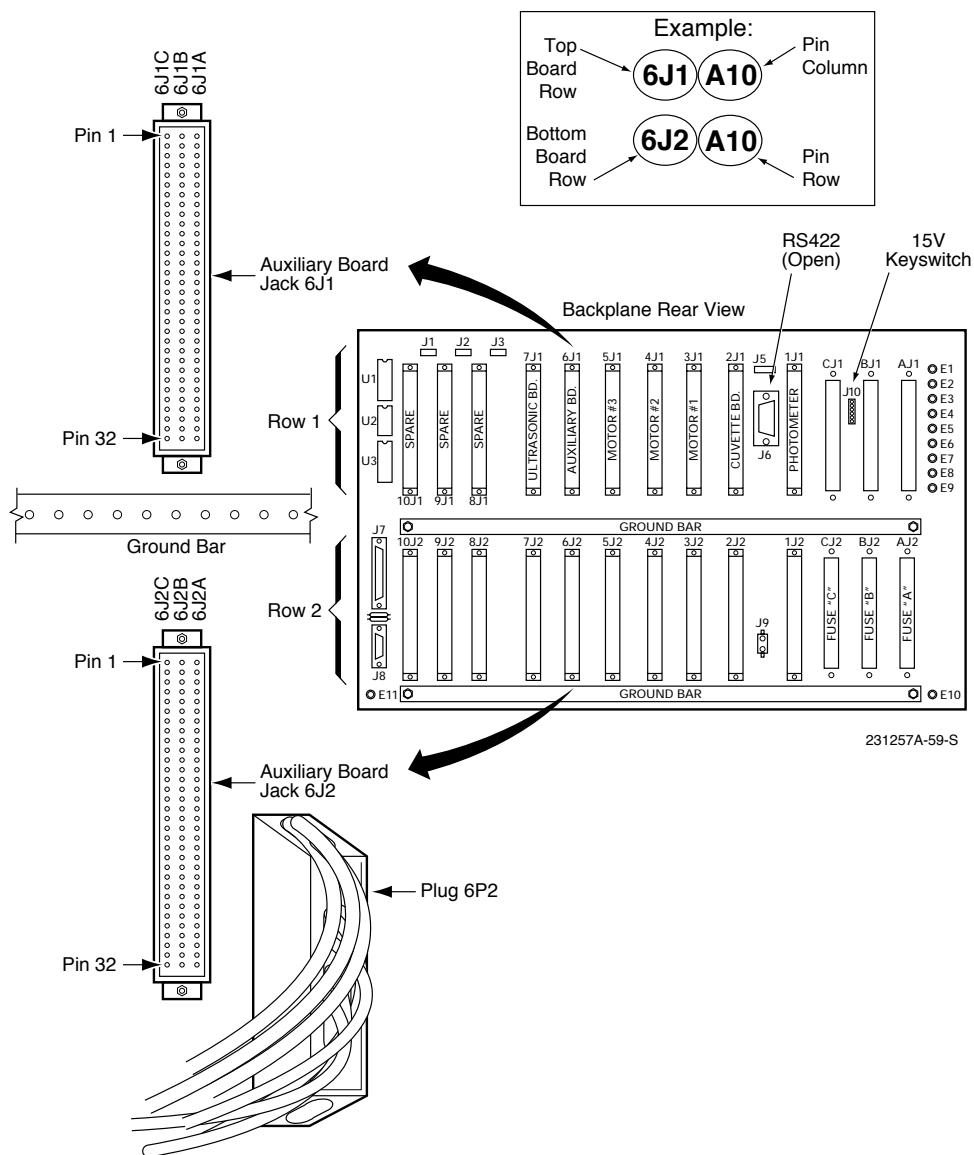
Table 3-14. Rotary Valve Positions

Component	Position Number
Sample	1
Air	2
Std. A	3
Std. B	5
None	7

Table 3-15. HM Consumables

Consumable
Reaction Vessels
Flex™ Reagent Cartridges
Chemistry Wash
Reagent Probe Cleaner
Sample Probe Cleaner
IMT Probe Cleaner

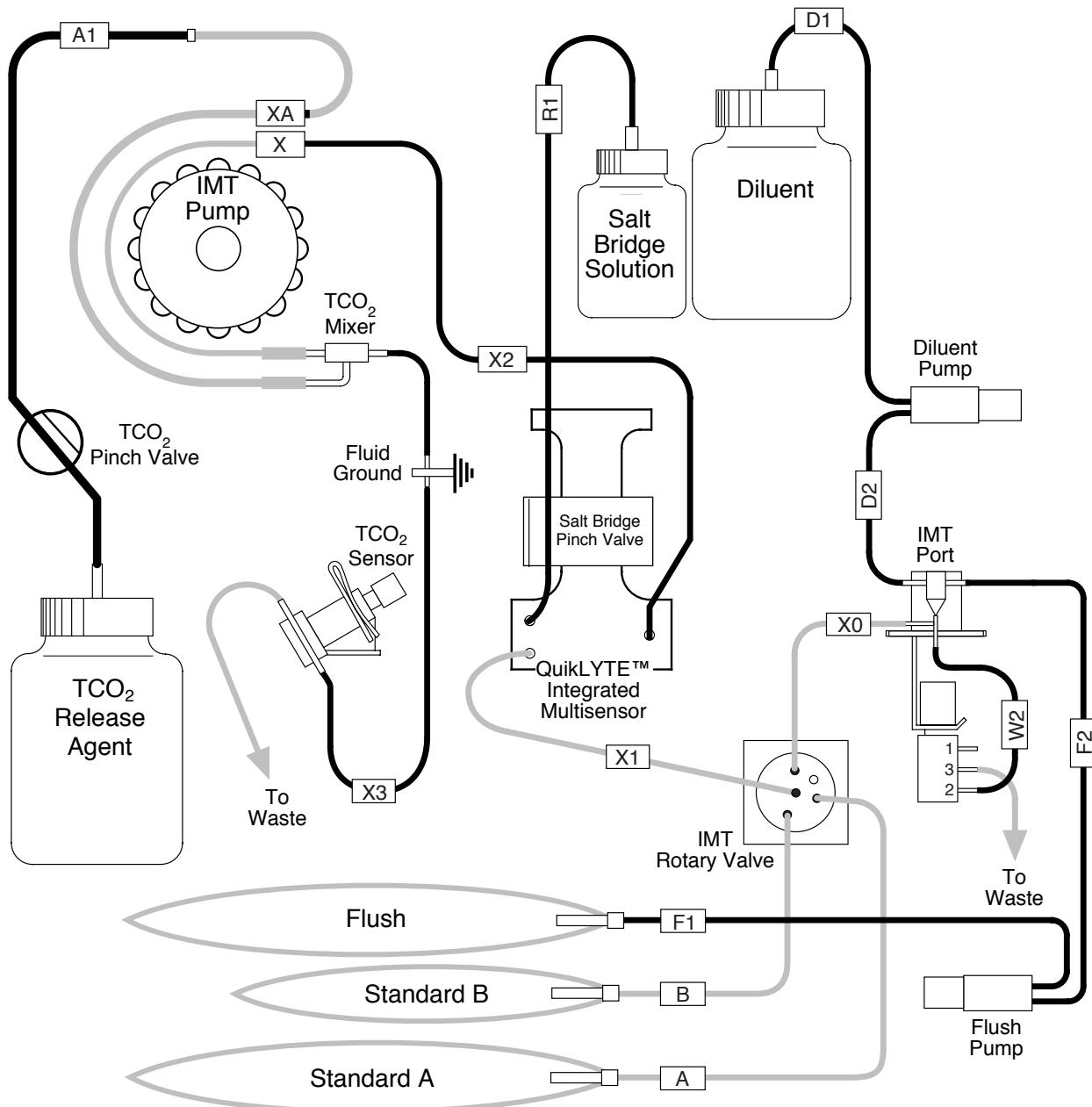
Backplane Board Configuration



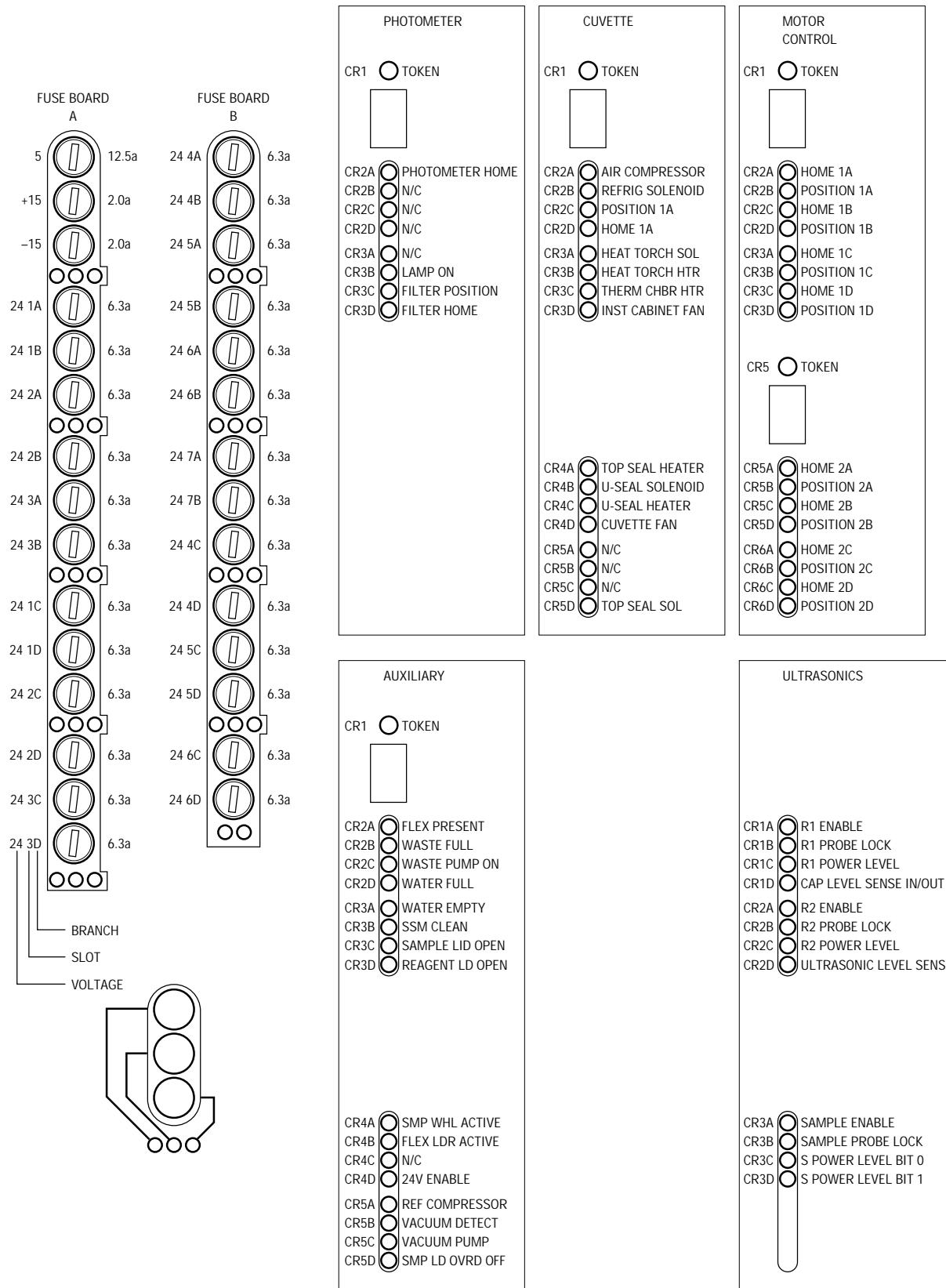
Backplane Board to Power Supply Connectors (see connectors on rear view above)

E1	0 V (DIG)	J1	RSt0+ RSt0- (J1 slots 9 and 10)
E2	0 V (15)	J2	RSt0+ RSt0- (J2 slots 8 and 9)
E3	0 V (24)	J3	RSt0+ RSt0- (J3 slots 7 and 8)
E4	+5 V(Line)	J5	RSt+ 1J1 RSt 1J1-
E5	+15 V (Line)	J7	Computer com port 2
E6	-15 V (Line)	J8	UPS
E7	0 V ((DIG))	J9	Source lamp
E8	+5 V		
E9	+24 V		
E10	Ground		
E11	Ground		

Indirect IMT System Diagram



240833C-500



Guidelines for Using the IMT System Shutdown Procedure

1. Operators will be trained to always keep IMT fluids on-board, even if not running the system over a shift, day or weekend. Fluid usage should be monitored and replaced as needed.
2. If IMT is not going to be run for an extended period (shift, day, weekend), the operator should verify sufficient fluids are on-board to sustain the two-point calibrations that will occur every two hours. The easiest approach in such a circumstance may be to simply replace all fluids before the period of non-use. A good rule of thumb is that the IMT system requires 48 consumable counts per 24-hour period of standby. Therefore, over a weekend you would want to have approximately 100 counts of each fluid available when you leave on Friday. The actual usage of each fluid during 24-hour standby is:

Std A	48 counts/24 hours
Std B	36 counts/24 hours
Std C	36 counts/24 hours
TCO ₂ release	36 counts/24 hours
Salt Bridge	36 counts/24 hours

3. The shutdown procedure (replacement of IMT fluids with water, priming) should only be used in exceptional circumstances, such as prolonged shutdown/power down of the instrument (e.g., for instrument shipping) or if the IMT is to be permanently deconfigured.
4. The following operational conditions may affect IMT fluid usage or system performance:
 - a. Calibrations and cycling of IMT fluids will continue even if the sensor life has exceeded 48 hours. Calibrations are only limited by the sufficiency of fluids.
 - b. The manifolds valves are cycled (opened/closed) every five minutes, but no fluids are consumed. This will always occur regardless of any consumables except in diagnostics.
 - c. A two-point calibration will occur every two hours, whether the prior calibration was successful or not. This ensures fluid and valve cycling independent of sensor performance. The XL will stop calibrating if unsuccessful.
 - d. In Diagnostics, no cycling or calibrating of IMT occurs. Prolonged periods in Diagnostics may result in some difficulties recalibrating due to restart of fluid flow and electrode drift. If in Diagnostics for prolonged periods of time (>4 hours), working on the photometric side of the instrument, Diagnostics should be exited periodically to recalibrate the IMT system.